

**Connecticut
Prekindergarten–Grade 8
Science Curriculum Standards
Including Grade-Level Expectations**

March 2009



Introduction

The *Connecticut Prekindergarten-Grade 8 Science Curriculum Standards Including Grade-Level Expectations* is a resource that supports the use of the 2004 Core Science Curriculum Framework to develop rigorous science curriculum, instruction and assessments. Grade-level expectations (GLEs) are instructional guidelines that describe what students should be able to do to demonstrate the science knowledge and abilities they have developed as a result of a series of learning experiences and a comprehensive curriculum.

The learner outcomes described in the GLEs are outgrowths of the Content Standards in the 2004 science framework. While some of the GLE outcomes are assessed on the science portion of the Connecticut Mastery Test (CMT), many of the GLEs are more practically demonstrated through classroom- and district-level assessments.

The Expected Performances in the 2004 science framework continue to be the basis for developing questions for the science CMT. However, the science curriculum should not be narrowed to include only those concepts or abilities that are tested on the CMT. Although not every GLE is directly assessed on the CMT, students who demonstrate competency in many GLEs are achieving the broader goal of scientific literacy, as well as becoming well-prepared to excel on state assessments.

The GLEs reflect a range of thinking processes, such as recalling facts, applying knowledge, analyzing, evaluating and creating. These outcomes should not be treated as a rigid hierarchy through which students pass sequentially. Students can succeed in demonstrating complex outcomes without first having achieved basic outcomes. In addition, expected performances for scientific inquiry described in the 2004 science framework have been integrated into each content standard, underscoring the importance of engaging students in scientific inquiry focused on core science concepts.

Connecticut science educators, RESC science specialists and university scientists contributed to the development of the GLEs. The Leadership and Learning Center (formerly the Center for Performance Assessment) reviewed the curriculum standards and GLEs for science. Recommendations were made and are reflected in this document. The following is a summary of the center's comparative analysis of the Connecticut Prekindergarten-Grade 8 Science Curriculum Standards Including Grade-Level Expectations:

“The [*Connecticut Prekindergarten-Grade 8 Science Curriculum Standards Including Grade-Level Expectations*] present the science content and inquiry abilities that students need in order to be science literate. The Curriculum Standards are comparable to the National Science Education Standards (National Research Council, 1996) and the Benchmarks for Science Literacy (AAAS, 1993), as well as to the science standards of two states (South Carolina and California) whose standards have been identified by the Thomas B. Fordham Institute's State of the State Science Standards 2005 as being exemplary.”

Connecticut Prekindergarten-Grade 8 Science Curriculum Standards Including Grade-Level Expectations is meant to assist district curriculum development, to help teachers align instruction to Connecticut's 2004 Core Science Curriculum Framework, and to improve student achievement in science. Districts have flexibility to prioritize those GLEs that they feel are most valuable for their students, keeping in mind that it is important to teach more than what is tested on the CMT. Among other applications, science educators may find GLEs useful for establishing measurable unit outcomes, designing learning activities, developing common formative and summative assessments, or for documenting and reporting student progress.

Using This Document

The content standards in the 2004 science framework are the foundation from which the GLEs are developed. Whereas the framework shows all four

content standards for a grade level on one page, this document presents each content standard on a separate page with a selection of GLE learner outcomes that can serve as targets for instruction and evidence of learning at that grade level.

Appearing at the top of each page are the grade level, the broad conceptual theme and the content standard as they are written in the science framework. The column labeled “Core Science Curriculum Framework” shows the grade-level concept indicated by a “◆” in the framework. Since content standards in the science framework can have one, two or three bulleted concepts, this curriculum standards document has assigned an “a,” “b” or “c” to identify each bullet. The column labeled “Grade-Level Expectations” shows the new guidelines for instructional outcomes. The right-hand column, “CMT Correlations,” shows performance expectations that may be measured on state-developed assessments.

Another outgrowth of the 2004 science framework is the addition of GLEs for the preschool science curriculum. Content Standards and Expected Performances for prekindergarten and kindergarten were merged in the 2004 framework. This curriculum standards document includes newly developed GLEs for preschool and correlates them to the previously published *Preschool Curriculum Framework and Preschool Assessment Framework*.

PREKINDERGARTEN

Properties of Matter

PK.1 — Objects have properties that can be observed and used to describe similarities and differences.

Core Science Curriculum Framework	Preschool Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Preschool Assessment Framework
PK.1.a. Some properties can be observed with the senses, and others can be discovered by using simple tools or tests.	Cognitive Development: Logical-Mathematical/Scientific Thinking <ul style="list-style-type: none"> • Ask questions about and comment on observations and experimentation. • Collect, describe and record information. • Use equipment for investigation. • Use common instruments to measure things. • Demonstrate understanding of one-to-one correspondence while counting. • Order several objects on the basis of one attribute. • Sort objects by one or more attributes and regroup the objects based on a new attribute. • Engage in a scientific experiment with a peer or with a small group. 	<ol style="list-style-type: none"> 1. Use senses to make observations of objects and materials within the child's immediate environment. 2. Use simple tools (e.g., balances and magnifiers) and nonstandard measurement units to observe and compare properties of objects and materials. 3. Make comments or express curiosity about observed phenomena (e.g., "I notice that..." or "I wonder if..."). 4. Count, order and sort objects (e.g., blocks, crayons, toys) based on one visible property (e.g., color, shape, size). 5. Conduct simple tests to determine if objects roll, slide or bounce. 	<p>COG 1 Engages in scientific inquiry</p> <p>COG 3 Sorts objects</p> <p>COG 5 Compares and orders objects and events</p> <p>COG 6 Relates number to quantity</p>

PREKINDERGARTEN

Heredity and Evolution

PK.2 — Many different kinds of living things inhabit the Earth.

Core Science Curriculum Framework	Preschool Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Preschool Assessment Framework
PK.2.a. Living things have certain characteristics that distinguish them from nonliving things, including growth, movement, reproduction and response to stimuli.	<p>Cognitive Development: Logical-Mathematical/Scientific Thinking</p> <ul style="list-style-type: none"> • Ask questions about and comment on observations and experimentation. • Collect, describe and record information. • Sort objects by one or more attributes and regroup the objects based on a new attribute. • Compare and contrast objects and events. <p>Personal and Social Development</p> <ul style="list-style-type: none"> • Identify themselves by family and gender. • State at least two ways in which children are similar and two ways in which they are different. 	<ol style="list-style-type: none"> 1. Use the senses and simple tools to make observations of characteristics and behaviors of living and nonliving things. 2. Give examples of living things and nonliving things. 3. Make observations and distinguish between the characteristics of plants and animals. 4. Compare attributes of self, family members or classmates, and describe how they are similar and different. 	<p>COG 1 Engages in scientific inquiry</p> <p>COG 3 Sorts objects</p> <p>COG 5 Compares and orders objects and events</p> <p>P & S 9 Recognizes similarities and appreciates differences</p>

PREKINDERGARTEN

Energy in the Earth's Systems

PK.3 — Weather conditions vary daily and seasonally.

Core Science Curriculum Framework	Preschool Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Preschool Assessment Framework
PK.3.a. Daily and seasonal weather conditions affect what we do, what we wear and how we feel.	<p>Cognitive Development: Logical-Mathematical/Scientific Thinking</p> <ul style="list-style-type: none"> • Ask questions about and comment on observations and experimentation. • Collect, describe and record information. • Demonstrate an understanding of sequence of events and time periods. • Make and verify predictions about what will occur. <p>Personal and Social Development</p> <ul style="list-style-type: none"> • Use self-help skills 	<ol style="list-style-type: none"> 1. Use the senses to observe and describe evidence of current or recent weather conditions (e.g., flags blowing, frost on window, puddles after rain, etc.). 2. Notice weather conditions and use words and numbers to describe and analyze conditions over time (e.g., “it rained five times this month”). 3. Identify the season that corresponds with observable conditions (e.g., falling leaves, snow vs. rain, buds on trees or greener grass). 4. Make judgments about appropriate clothing and activities based on weather conditions. 	<p>COG 1 Engages in scientific inquiry</p> <p>PHY 3 Cares for self independently</p>

PREKINDERGARTEN

Science and Technology in Society

PK.4 — Some objects are natural, while others have been designed and made by people to improve the quality of life.

Core Science Curriculum Framework	Preschool Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Preschool Assessment Framework
PK.4.a. Humans select materials with which to build structures based on the properties of the materials.	<p>Cognitive Development: Logical-Mathematical/Scientific Thinking</p> <ul style="list-style-type: none"> • Ask questions about and comment on observations and experimentation. • Sort objects by one or more attributes and regroup the objects based on a new attribute. • Make and verify predictions about what will occur. • Engage in a scientific experiment with a peer or with a small group. <p>Personal and Social Development</p> <ul style="list-style-type: none"> • Demonstrate the ability to use a minimum of two different strategies to attempt to solve a problem. <p>Creative Expression/Aesthetic Development</p> <ul style="list-style-type: none"> • Use a variety of art materials and activities for sensory experience and exploration. 	<ol style="list-style-type: none"> 1. Observe, describe and sort building materials by properties such as strength, weight, stiffness or flexibility. 2. Pose questions and conduct simple tests to compare the effectiveness of different building materials (e.g., blocks of wood, plastic, foam or cardboard) for constructing towers, bridges and buildings. 3. Make judgments about the best building materials to use for different purposes (e.g., making the tallest tower or the longest bridge). 4. Invent and explain techniques for stabilizing a structure. 5. Compare block structures to pictures and to real structures in the neighborhood. 	<p>P & S 1 Shows self-direction with a range of materials</p> <p>COG 1 Engages in scientific inquiry</p> <p>COG 2 Uses a variety of strategies to solve problems</p> <p>COG 3 Sorts objects</p> <p>COG 7 Demonstrates spatial awareness</p> <p>CRE 1 Builds and constructs to represent own ideas</p>

KINDERGARTEN

Properties of Matter

K.1 — Objects have properties that can be observed and used to describe similarities and differences.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
K.1.a. Some properties can be observed with the senses, and others can be discovered by using simple tools or tests.	<ol style="list-style-type: none"> 1. Match each of the five senses with its associated body part and the kind of information it perceives. 2. Make scientific observations using the five senses, and distinguish between an object's observable properties and its name or its uses. 3. Classify organisms or objects by one and two observable properties and explain the rule used for sorting (e.g., size, color, shape, texture or flexibility). 4. Use simple tools and nonstandard units to estimate or predict properties such as size, heaviness, magnetic attraction and float/sink. 5. Describe properties of materials such as wood, plastic, metal, cloth or paper and sort objects by the material from which they are made. 6. Count, order and sort objects by their observable properties. 	<p>A1. Use the senses and simple measuring tools, such as rulers and equal-arm balances, to observe common objects and sort them into groups based on size, weight, shape or color.</p> <p>A2. Sort objects made of materials such as wood, paper and metal into groups based on properties such as flexibility, attraction to magnets, and whether they float or sink in water.</p> <p>A3. Count objects in a group and use mathematical terms to describe quantitative relationships such as: same as, more than, less than, equal, etc.</p>

KINDERGARTEN

Heredity and Evolution

K.2 — Many different kinds of living things inhabit the Earth.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
K.2.a. Living things have certain characteristics that distinguish them from nonliving things, including growth, movement, reproduction and response to stimuli.	<ol style="list-style-type: none"> 1. Observe and describe differences between living and nonliving things in terms of growth, offspring and need for energy from “food.” 2. Sort and count living and nonliving things in the classroom, the schoolyard and in pictures. 3. Use nonstandard measures to estimate and compare the height, length or weight of different kinds of plants and animals. 4. Observe and write, speak or draw about similarities and differences between plants and animals. 5. Match pictures or models of adults with their offspring (animals and plants). 6. Recognize varied individuals as examples of the same kind of living thing (e.g., different color rabbits are all rabbits; different breeds of dogs are all dogs). 	<p>A4. Describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects and mammals (including humans).</p> <p>A5. Describe the similarities and differences in the appearance and behaviors of adults and their offspring.</p> <p>A6. Describe characteristics that distinguish living from nonliving things.</p>

KINDERGARTEN

Energy in the Earth's Systems

K.3 — Weather conditions vary daily and seasonally.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
K.3.a. Daily and seasonal weather conditions affect what we do, what we wear and how we feel.	<ol style="list-style-type: none"> 1. Use the senses to observe daily weather conditions and record data systematically using organizers such as tables, charts, picture graphs or calendars. 2. Analyze weather data collected over time (during the day, from day to day, and from season to season) to identify patterns and make comparisons and predictions. 3. Observe, compare and contrast cloud shapes, sizes and colors, and relate the appearance of clouds to fair weather or precipitation. 4. Write, speak or draw ways that weather influences humans, other animals and plants. 5. Make judgments about appropriate clothing and activities based on weather conditions. 	<p>A7. Describe and record daily weather conditions.</p> <p>A8. Relate seasonal weather patterns to appropriate choices of clothing and activities.</p>

KINDERGARTEN

Science and Technology in Society

K.4 — Some objects are natural, while others have been designed and made by people to improve the quality of life.

This content standard is an application of the concepts in content standard K.1 and should be integrated into the same unit.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
K.4.a. Humans select both natural and man-made materials to build shelters based on local climate conditions, properties of the materials, and their availability in the environment.	<ol style="list-style-type: none"> 1. Conduct simple tests to compare the properties of different materials and their usefulness for making roofs, windows, walls or floors (e.g., waterproof, transparent, strong). 2. Seek information in books, magazines and pictures that describes materials used to build shelters by people in different regions of the world. 3. Compare and contrast the materials used by humans and animals to build shelters. 	A9. Describe the types of materials used by people to build houses and the properties that make the materials useful.

GRADE 1

Forces and Motion

1.1 — The sun appears to move across the sky in the same way every day, but its path changes gradually over the seasons.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
<p>1.1.a An object's position can be described by locating it relative to another object or the background.</p> <p>1.1.b An object's motion can be described by tracing and measuring its position over time.</p>	<ol style="list-style-type: none"> 1. Compare and contrast the relative positions of objects using words (in front of, behind, next to, inside of, above or below) and numbers (by measuring its distance from another object). 2. Apply direct and indirect pushes and pulls to cause objects to move (change position) in different ways (e.g., straight line, forward and backward, zigzag, in a circle). 3. Classify objects by the way they move (e.g., spinning, rolling, bouncing). 4. Conduct simple experiments and evaluate different ways to change the speed and direction of an object's motion. 5. Observe, record and predict the sun's position at different times of day (morning, noon, afternoon or night). 6. Conduct simple investigations of shadows and analyze how shadows change as the relative position of the sun (or an artificial light source) changes. 	<p>A10. Describe how the motion of objects can be changed by pushing and pulling.</p> <p>A11. Describe the apparent movement of the sun across the sky and the changes in the length and direction of shadows during the day.</p>

GRADE 1

Structure and Function

1.2 — Living things have different structures and behaviors that allow them to meet their basic needs.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
<p>1.2.a. Animals need air, water and food to survive</p> <p>1.2.b. Plants need air, water and sunlight to survive.</p>	<ol style="list-style-type: none"> 1. Infer from direct observation and print or electronic information that most animals and plants need water, food and air to stay alive. 2. Identify structures and behaviors used by mammals, birds, amphibians, reptiles, fish and insects to move around, breathe and obtain food and water (e.g., legs/ wings/fins, gills/lungs, claws/fingers, etc.) 3. Sort and classify plants (or plant parts) by observable characteristics (e.g., leaf shape/size, stem or trunk covering, flower or fruit). 4. Use senses and simple measuring tools to measure the effects of water and sunlight on plant growth. 5. Compare and contrast information about animals and plants found in fiction and nonfiction sources. 	<p>A12. Describe the different ways that animals, including humans, obtain water and food.</p> <p>A13. Describe the different structures plants have for obtaining water and sunlight.</p> <p>A14. Describe the structures that animals, including humans, use to move around.</p>

GRADE 1

Structure and Function

1.3 — Organisms change in form and behavior as part of their life cycles.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
1.3.a. Some organisms undergo metamorphosis during their life cycles; other organisms grow and change, but their basic form stays essentially the same.	<ol style="list-style-type: none"> 1. Explain that living things experience a life cycle during which they undergo a predictable sequence of changes from birth, growth, reproduction and death. 2. Distinguish between animals that are born alive (e.g., humans, dogs, cows) and those that hatch from eggs (e.g., chickens, sea turtles, crocodiles). 3. Compare and contrast the changes in structure and behavior that occur during the life cycles of animals that undergo metamorphosis with those that do not. 4. Analyze recorded observations to compare the metamorphosis stages of different animals, and make predictions based on observed patterns. 	<p>A15. Describe the changes in organisms, such as frogs and butterflies, as they undergo metamorphosis.</p> <p>A16. Describe the life cycles of organisms that grow but do not metamorphose.</p>

GRADE 1**Science and Technology in Society**

1.4 - The properties of materials and organisms can be described more accurately through the use of standard measuring units.

This content standard should be integrated within all PK–5 standards.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
1.4.a. Various tools can be used to measure, describe and compare different objects and organisms.	<ol style="list-style-type: none">1. Use nonstandard and standard measurements to describe and compare the weight, length and size of objects and organisms.2. Show approximate size of a centimeter, meter, inch, foot and yard using referents such as a finger, a hand or a book.3. Select appropriate tools for measuring length, height, weight or liquid volume.4. Use metric and customary rulers to measure length, height or distance in centimeters, meters, inches, feet and yards.5. Use balances and scales to compare and measure the heaviness of objects and organisms in kilograms, grams, pounds and ounces.6. Use graduated cylinders, beakers and measuring cups to measure the volume of liquids in milliliters, liters, cups and ounces.7. Use thermometers to measure air and water temperature in degrees Celsius and degrees Fahrenheit.8. Make graphs to identify patterns in recorded measurements such as growth or temperature over time.	A17. Estimate, measure and compare the sizes and weights of different objects and organisms using standard and nonstandard measuring tools.

GRADE 2**Properties of Matter**

2.1 — Materials can be classified as solid, liquid or gas based on their observable properties.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
2.1.a Solids tend to maintain their own shapes, while liquids tend to assume the shapes of their containers, and gases fill their containers fully.	<ol style="list-style-type: none">1. Compare and contrast the properties that distinguish solids, liquids and gases.2. Classify objects and materials according to their state of matter.3. Measure and compare the sizes of different solids.4. Measure and compare the volume of a liquid poured into different containers.5. Design a fair test to compare the flow rates of different liquids and granular solids.	A18. Describe differences in the physical properties of solids and liquids.

GRADE 2

Structure and Function

2.2 — Plants change their forms as part of their life cycles.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
2.2.a. The life cycles of flowering plants include seed germination, growth, flowering, pollination and seed dispersal.	<ol style="list-style-type: none"> 1. Use senses and simple tools to observe and describe the roots, stems, leaves, flowers and seeds of various plants (including trees, vegetables and grass.) 2. Use magnifiers to observe and diagram the parts of a flower. 3. Describe the functions of roots, stems, leaves, flowers and seeds in completing a plant's life cycle. 4. Record observations and make conclusions about the sequence of stages in a flowering plant's life cycle. 5. Compare and contrast how seeds of different plants are adapted for dispersal by water, wind or animals. 6. Conduct a fair test to explore factors that affect seed germination and plant growth. 	<p>A19. Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds.</p> <p>A20. Explore and describe the effects of light and water on seed germination and plant growth.</p>

GRADE 2

The Changing Earth

2.3 — Earth materials have varied physical properties, which make them useful in different ways.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
<p>2.3.a. Soils can be described by their color, texture and capacity to retain water.</p> <p>2.3.b. Soils support the growth of many kinds of plants, including those in our food supply.</p>	<ol style="list-style-type: none"> 1. Use senses and simple tools (e.g., sieves and beakers) to separate soil into components such as rock fragments, water, air and plant remains. 2. Classify soils by properties such as color, particle size (sand, silt or clay), or amount of organic material (loam). 3. Explain the importance of soil to plants, animals and people. 4. Evaluate the quality of different soils in terms of observable presence of air, water, living things and plant remains. 5. Conduct fair tests to investigate how different soil types affect plant growth, and write conclusions supported by evidence. 	<p>A21. Sort different soils by properties, such as particle size, color and composition.</p> <p>A22. Relate the properties of different soils to their capacity to retain water and support the growth of certain plants.</p>

GRADE 2

Science and Technology in Society

2.4 - Human beings, like all other living things, have special nutritional needs for survival.

This content standard is an application of the concepts in content standard 2.3 and should be integrated into the same unit.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	Assessment
<p>2.4.a. The essential components of balanced nutrition can be obtained from plant and animal sources.</p> <p>2.4.b. People eat different foods in order to satisfy nutritional needs for carbohydrates, proteins and fats.</p>	<ol style="list-style-type: none"> 1. Explain that food is a source of carbohydrates, proteins and fats — nutrients that animals (including humans) convert to energy they use to stay alive and grow. 2. Classify foods into groups based on their source, and relate common foods to the plant or animal from which they come. 3. Give examples of ways people can improve soil quality and crop growth (e.g., irrigation, fertilizer, pest control). 4. Compare and contrast how different cultures meet needs for basic nutrients by consuming various foods. 5. Evaluate the nutritional value of different foods by analyzing package labels. 	<p>A23. Identify the sources of common foods and classify them by their basic food groups.</p> <p>A24. Describe how people in different cultures use different food sources to meet their nutritional needs.</p>

GRADE 3**Properties of Matter**

3.1 - Materials have properties that can be identified and described through the use of simple tests.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
3.1.a. Heating and cooling cause changes in some of the properties of materials.	<ol style="list-style-type: none">1. Compare and contrast the properties of solids, liquids and gases.2. Demonstrate that solids, liquids and gases are all forms of matter that take up space and have weight.3. Carry out simple tests to determine if materials dissolve, sink or float in water; conduct heat; or attract to magnets.4. Classify materials based on their observable properties, including state of matter.5. Design and conduct fair tests to investigate the absorbency of different materials, write conclusions based on evidence, and analyze why similar investigations might produce different results.6. Explain the role of heating and cooling in changing matter from one state to another during freezing, melting, evaporation and condensation.	<p>B1. Sort and classify materials based on properties such as dissolving in water, sinking and floating, conducting heat, and attracting to magnets.</p> <p>B2. Describe the effect of heating on the melting, evaporation, condensation and freezing of water.</p>

GRADE 3**Heredity and Evolution**

3.2 — Organisms can survive and reproduce only in environments that meet their basic needs.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
3.2.a. Plants and animals have structures and behaviors that help them survive in different environments.	<ol style="list-style-type: none">1. Compare and contrast the external features and behaviors that enable different animals and plants (including those that are extinct) to get food, water and sunlight; find mates; and be protected in specific land and water habitats.2. Explain how behaviors such as hibernation, dormancy and migration give species advantages for surviving unfavorable environmental conditions.3. Give examples of ways animals benefit from camouflage.4. Evaluate whether an adaptation gives a plant or animal a survival advantage in a given environment.5. Design a model of an organism whose adaptations give it an advantage in a specific environment.	<p>B3. Describe how different plants and animals are adapted to obtain air, water, food and protection in specific land habitats.</p> <p>B4. Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.</p>

GRADE 3

The Changing Earth

3.3 — Earth materials have different physical and chemical properties.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>3.3.a. Rocks and minerals have properties that may be identified through observation and testing; these properties determine how earth materials are used.</p>	<ol style="list-style-type: none"> 1. Differentiate between rocks and minerals. 2. Use the senses and simple measuring tools to gather data about various rocks and classify them based on observable properties (e.g., shape, size, color, weight, visible markings). 3. Conduct simple tests to determine properties of different minerals (e.g., color, odor, streak, luster, hardness, magnetism), organize data in a table, and use the data and other resources to identify unknown mineral specimens. 4. Summarize nonfiction text to compare and contrast the conditions under which igneous, metamorphic and sedimentary rocks are formed. 5. Observe and analyze rock properties (e.g., crystal size or layers) to infer the conditions under which the rock was formed. 6. Evaluate the usefulness of different rock types for specific applications (e.g., buildings, sidewalks, stone walls, statues or monuments). 	<p>B5. Describe the physical properties of rocks and relate them to their potential uses.</p> <p>B6. Relate the properties of rocks to the possible environmental conditions during their formation.</p>

GRADE 3

Science and Technology in Society

3.4 — Earth materials provide resources for all living things, but these resources are limited and should be conserved.

This content standard is an application of the concepts in content standard 3.1 and 3.3 and should be integrated into one of these units.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
3.4.a Decisions made by individuals can impact the global supply of many resources.	<ol style="list-style-type: none"> 1. Describe ways people use earth materials, such as fossil fuels, trees, water, soils and rocks as natural resources to improve their lives. 2. Summarize nonfiction text to explain how humans use technology to access and use natural resources to produce electricity or other products (e.g., paper or concrete). 3. Explain advantages and disadvantages of renewable and nonrenewable energy sources that can be used for making electricity, fueling cars or heating homes. 4. Design and conduct experiments to evaluate the effectiveness of different insulating materials for keeping a substance warm or cold (i.e., conducting heat). 5. Use mathematics to estimate, measure and graph the quantity of a natural resource (e.g., water, paper) used by an individual (or group) in a certain time period. 6. Distinguish among reducing, reusing, recycling and replacing as conservation techniques. 	B7. Describe how earth materials can be conserved by reducing the quantities used, and by reusing and recycling materials rather than discarding them.

GRADE 4**Forces and Motion**

4.1 — The position and motion of objects can be changed by pushing or pulling.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>4.1.a. The size of the change in an object's motion is related to the strength of the push or pull.</p> <p>4.1.b. The more massive an object is, the less effect a given force will have on its motion.</p>	<ol style="list-style-type: none">1. Demonstrate that a force can cause an object to start moving, stop, or change speed or direction.2. Use measurement tools and standard units to compare and contrast the motion of objects such as toy cars, balls, model rockets or planes in terms of change in position, speed and direction.3. Design and conduct experiments to determine how the motion of objects is related to the mass of the object and the strength of the force applied.4. Describe how friction forces caused by air resistance or interactions between surface materials affect the motion of objects.5. Predict the effect of an object's mass on its motion.	<p>B8. Describe the effects of the strengths of pushes and pulls on the motion of objects.</p> <p>B9. Describe the effect of the mass of an object on its motion.</p>

GRADE 4

Matter and Energy in Ecosystems

4.2 — All organisms depend on the living and nonliving features of the environment for survival.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
4.2.a. When the environment changes, some organisms survive and reproduce, and others die or move to new locations.	<ol style="list-style-type: none"> 1. Give examples of ways that living and nonliving things are interdependent within an ecosystem. 2. Draw diagrams showing how the sun’s energy enters and is transferred from producers to consumers in a local land or aquatic food chain. 3. Design and conduct simple investigations to record interactions among producers, consumers, herbivores, carnivores, omnivores and decomposers in an ecosystem. 4. Analyze food webs to describe how energy is transferred from plants to various animals in an ecosystem. 5. Distinguish between naturally occurring changes in ecosystems and those caused by human activity. 6. Predict the effect an environmental change, such as drought or forest destruction, might have on the community of living things. 	<p>B10. Describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive.</p> <p>B11. Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.</p>

GRADE 4

Energy in the Earth's Systems

4.3 — Water has a major role in shaping the Earth's surface.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
4.3.a. Water circulates through the Earth's crust, oceans and atmosphere.	<ol style="list-style-type: none"> 1. Describe the role of the sun's energy (i.e., heating and cooling) in the continuous cycling of water between the earth and the atmosphere through evaporation, condensation and precipitation. 2. Use models to demonstrate that topography causes precipitation landing on earth to move in streams and rivers from higher to lower elevations. 3. Design and conduct simple investigations to determine how moving water (flowing downhill or in ocean waves) causes changes to the land, the coastline or the course of a stream or river. 4. Pose testable questions and employ simple equipment and measuring tools to collect data about factors that affect erosion (e.g., type of earth material in an area, volume of moving water, slope of land, vegetation coverage). 5. Present evidence to support a scientific claim about the relationship between the amount and speed of moving water and the size of earth materials moved (e.g., silt, pebbles, boulders). 	<p>B12. Describe how the sun's energy impacts the water cycle.</p> <p>B13. Describe the role of water in erosion and river formation.</p>

GRADE 4

Science and Technology in Society

4.4 — Electrical and magnetic energy can be transferred and transformed.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>4.4.a. Electricity in circuits can be transformed into light, heat, sound and magnetic effects.</p> <p>4.4.b. Magnets can make objects move without direct contact between the object and the magnet.</p>	<ol style="list-style-type: none"> 1. Construct complete (closed) and incomplete (open) series circuits in which electrical energy is transformed into heat, light, sound and/or motion energy. 2. Draw labeled diagrams of complete and incomplete circuits and explain necessary components and how components must be arranged to make a complete circuit. 3. Predict whether diagrammed circuit configurations will light a bulb. 4. Develop a method for testing conductivity, and analyze data to generalize about which materials are good electrical conductors and which are good insulators. 5. Observe magnetic effects associated with electricity and investigate factors that affect the strength of an electromagnet. 6. Describe materials that are attracted by magnets. 7. Design procedures to move objects and separate mixtures of solids using magnets. 8. Investigate how magnets react with other magnets and analyze findings to identify patterns in the interactions between north and south poles of magnets. 9. Give examples of uses of magnets (e.g., motors, generators, household devices). 	<p>B14. Describe how batteries and wires can transfer energy to light a bulb.</p> <p>B15. Explain how simple electrical circuits can be used to determine which materials conduct electricity.</p> <p>B16. Describe the properties of magnets, and how they can be used to identify and separate mixtures of solid materials.</p>

GRADE 5

Energy Transfer and Transformations

5.1 — Sound and light are forms of energy.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>5.1.a. Sound is a form of energy that is produced by the vibration of objects and is transmitted by the vibration of air and objects.</p>	<ol style="list-style-type: none"> 1. Generalize that vibrating objects produce sound if the vibrations are transferred from the object through another material (e.g., air, a solid, or a liquid). 2. Demonstrate how the loudness, pitch and quality/timbre of sound can be varied. 3. Design and conduct investigations to determine factors that affect pitch. 4. Describe the properties of materials that reflect or absorb sound. 5. Construct simple musical instruments (e.g., rubber band guitars, drums, etc.) that produce sounds with various pitches, volume and timbres. 	<p>B17. Describe the factors that affect the pitch and loudness of sound produced by vibrating objects.</p> <p>B18. Describe how sound is transmitted, reflected and/or absorbed by different materials.</p>

GRADE 5

Energy Transfer and Transformations

5.1 — Sound and light are forms of energy.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
5.1.b. Light is a form of energy that travels in a straight line and can be reflected by a mirror, refracted by a lens, or absorbed by objects.	<ol style="list-style-type: none"> 1. Provide evidence that light travels in straight lines away from a source in all directions. 2. Investigate how light is refracted as it passes through a lens or through one transparent material to another. 3. Demonstrate that white light is composed of many colors. 4. Explain that all visible objects are reflecting some light to the human eye. 5. Contrast the way light is reflected by smooth, shiny objects (e.g., mirror or pool of water) and how it is reflected by other objects. 6. Measure angles to predict the path of light reflected by a mirror. 7. Determine whether a material is opaque, transparent or translucent based on how light passes through it. 8. Design and conduct light absorption experiments that vary the size, length, direction and clarity of a shadow by changing the position of the light-blocking object or the light source. 	B19. Describe how light is absorbed and/or reflected by different surfaces.

GRADE 5

Structure and Function

5.2 — Perceiving and responding to information about the environment is critical to the survival of organisms.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
5.2.a The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.	<ol style="list-style-type: none"> 1. Explain the role of sensory organs in perceiving stimuli (e.g., light/dark, heat/cold, flavors, pain, etc.) and sending signals to the brain. 2. Pose testable questions and design experiments to explore factors that affect human reaction time. 3. Conduct simple tests to explore the capabilities of the human senses. 4. Summarize nonfiction text to explain the role of the brain and spinal cord in responding to information received from the sense organs. 5. Identify the major structures of the human eye, ear, nose, skin and tongue, and explain their functions. 6. Draw diagrams showing the straight path of light rays from a source to a reflecting object to the eye, allowing objects to be seen. 7. Describe the properties of different materials and the structures in the human eye that enable humans to perceive color. 	<p>B20. Describe how light absorption and reflection allow one to see the shapes and colors of objects.</p> <p>B21. Describe the structure and function of the human senses and the signals they perceive.</p>

GRADE 5

Earth in the Solar System

5.3 — Most objects in the solar system are in a regular and predictable motion.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
5.3.a. The positions of the Earth and moon relative to the sun explain the cycles of day and night, and the monthly moon phases.	<ol style="list-style-type: none"> 1. Explain the motion of the Earth relative to the sun that causes Earth to experience cycles of day and night. 2. Construct models demonstrating Earth's rotation on its axis, the moon's revolution around the Earth, and the Earth and moon revolving around the sun. 3. Distinguish between the sun as a source of light and the moon as a reflection of that light. 4. Observe and record the moon's appearance over time and analyze findings to describe the cyclical changes in its appearance from Earth (moon phases). 5. Relate the moon phases to changes in the moon's position relative to the Earth and sun during its 29-day revolution around the Earth. 	<p>B22. Explain the cause of day and night based on the rotation of Earth on its axis.</p> <p>B23. Describe the monthly changes in the appearance of the moon, based on the moon's orbit around the Earth.</p>

GRADE 5

Science and Technology in Society

5.4 — Humans have the capacity to build and use tools to advance the quality of their lives.

This content standard is an application of the concepts in content standard 5.1 and should be integrated into the same unit.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations															
5.4.a. Advances in technology allow individuals to acquire new information about the world.	<ol style="list-style-type: none"> Generalize that optical tools, such as binoculars, telescopes, eyeglasses or periscopes, change the path of light by reflecting or refracting it. Construct simple periscopes and telescopes, and analyze how the placement of their lenses and mirrors affects the quality of the image formed. Evaluate the best optical instrument to perform a given task. Design and conduct simple investigations to determine how the shape of a lens or mirror (concave, convex, flat) affects the direction in which light rays travel. Explain how eyeglasses or contact lenses improve vision by changing the path of light to the retina. Analyze the similarities and differences between structures of the human eye and those of a simple camera. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>HUMAN EYE</th><th>CAMERA</th><th>FUNCTION</th></tr> </thead> <tbody> <tr> <td>Eyelid</td><td>Lens cap</td><td>Protect interior parts</td></tr> <tr> <td>Pupil</td><td>Lens opening (aperture)</td><td>Allow light to enter</td></tr> <tr> <td>Cornea, lens</td><td>Lens</td><td>Focus light rays on a point</td></tr> <tr> <td>Retina</td><td>Film (or digital medium)</td><td>Respond to light resulting in an image</td></tr> </tbody> </table>	HUMAN EYE	CAMERA	FUNCTION	Eyelid	Lens cap	Protect interior parts	Pupil	Lens opening (aperture)	Allow light to enter	Cornea, lens	Lens	Focus light rays on a point	Retina	Film (or digital medium)	Respond to light resulting in an image	<p>B24. Compare and contrast the structures of the human eye with those of the camera.</p> <p>B25. Describe the uses of different instruments, such as eyeglasses, magnifiers, periscopes and telescopes, to enhance our vision.</p>
HUMAN EYE	CAMERA	FUNCTION															
Eyelid	Lens cap	Protect interior parts															
Pupil	Lens opening (aperture)	Allow light to enter															
Cornea, lens	Lens	Focus light rays on a point															
Retina	Film (or digital medium)	Respond to light resulting in an image															

GRADE 6

Properties of Matter

6.1 — Materials can be classified as pure substances or mixtures, depending on their chemical and physical properties.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>6.1.a Mixtures are made of combinations of elements and/or compounds, and they can be separated by using a variety of physical means.</p> <p>6.1.b Pure substances can be either elements or compounds, and they cannot be broken down by physical means.</p>	<ol style="list-style-type: none"> Describe the structure of the atom and its component parts. Explain that density (mass/volume) is a characteristic property that can be used to identify an element or substance. Compare and contrast the properties of a metal (aluminum, iron, etc.) with a nonmetal (oxygen, carbon, etc.) Illustrate the differences in the physical and chemical properties of a molecule and the individual atoms that bonded to form that molecule. Differentiate between a mixture and an element or compound and identify examples. Conduct and report on an investigation that uses physical means such as particle size, density, solubility and magnetism to separate substances in a mixture. Use the patterns in the Periodic Table to locate metals, semimetals and nonmetals and to predict the general characteristics of an element. 	<p>C1. Describe the properties of common elements, such as oxygen, hydrogen, carbon, iron and aluminum.</p> <p>C2. Describe how the properties of simple compounds, such as water and table salt, are different from the properties of the elements of which they are made.</p> <p>C3. Explain how mixtures can be separated by using the properties of the substances from which they are made, such as particle size, density, solubility and boiling point.</p>

GRADE 6

Matter and Energy in Ecosystems

6.2 — An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>6.2.a Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply.</p> <p>6.2.b Populations in ecosystems can be categorized as producers, consumers and decomposers of organic matter.</p>	<ol style="list-style-type: none"> 1. Analyze and interpret how biotic and abiotic factors interact within a given ecosystem. 2. Design and conduct a scientific investigation to explore the porosity and permeability of soils and their ability to support different plant life. 3. Defend the statement, “The sun is the main source of energy on Earth.” 4. Express in general terms how plants and other photosynthetic organisms use the sun’s energy. 5. Investigate and report on the effects of abiotic factors on a plant’s ability to photosynthesize. 6. Compare and contrast how energy and matter flow in a Connecticut ecosystem, emphasizing the interactions among producers, consumers and decomposers. 7. Identify local examples of predator-prey relationships and justify the impact of each type of population on the other. 8. Create and interpret graphs that illustrate the fluctuation of populations over time. 9. Distinguish a food chain from a food web and identify local examples of each. 10. Explain the impact of environmental conditions such as climate, elevation, topography or water quality on food chains. 11. Predict what will happen to a population based on current trends (fires, disease, overhunting, development) and defend the prediction. 	<p>C4. Describe how abiotic factors, such as temperature, water and sunlight, affect the ability of plants to create their own food through photosynthesis.</p> <p>C5. Explain how populations are affected by predator-prey relationships.</p> <p>C6. Describe common food webs in different Connecticut ecosystems.</p>

GRADE 6

Energy in the Earth's Systems

6.3 — Variations in the amount of the sun's energy hitting the Earth's surface affect daily and seasonal weather patterns.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>6.3.a Local and regional weather are affected by the amount of solar energy the area receives and proximity to a large body of water.</p>	<ol style="list-style-type: none"> 1. Compare the composition and structure of the Earth's atmospheric layers. 2. Demonstrate how changes in temperature, pressure, moisture and density of air affect weather patterns (e.g., air masses and air pressure.) 3. Describe in writing how solar energy drives Earth's weather systems. 4. Investigate and report on how the introduction of heat affects the motion of particles and the distance between them. 5. Illustrate the transfer of energy as matter changes phase. 6. Design, conduct and report in writing an investigation that reveals different substances absorb and release heat at different rates. 7. Research and give examples of heat transfer and local weather differences in Connecticut. 8. Investigate and explain the movement of local winds, including "sea breezes" and "land breezes," based on the uneven heating of the Earth's surface and a change in air pressure. 9. Examine and explain that global winds are caused by uneven heating of the Earth's surface and the rotation of the Earth. 10. Design a weather forecast based on collected weather data. 	<p>C7. Describe the effect of heating on the movement of molecules in solids, liquids and gases.</p> <p>C8. Explain how local weather conditions are related to the temperature, pressure and water content of the atmosphere and the proximity to a large body of water.</p> <p>C9. Explain how the uneven heating of the Earth's surface causes winds.</p>

GRADE 6

Science and Technology in Society

6.4 — Water moving across and through earth materials carries with it the products of human activities.

This content standard is an application of the concepts in content standard 6.3 and should be integrated into the same unit.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
6.4.a Most precipitation that falls on Connecticut eventually reaches Long Island Sound.	<ol style="list-style-type: none"> 1. Discuss and chart the reasons why water is essential for life. 2. Observe, analyze and record the unique physical and chemical properties of water. 3. Research the differences in quantities between fresh water (solid and liquid) and salt water covering the Earth's surface and report on the impact to humans. 4. Investigate and explain in writing how substances, both harmful and beneficial, dissolve in and are carried by surface and ground water. 5. Use appropriate maps to locate and identify the major watersheds that drain into Long Island Sound and analyze how the topography influences the way water moves in the Long Island Sound watershed. 6. Research and evaluate in writing the effects of common point and nonpoint water pollutants in Connecticut. 7. Compare and contrast the general structures, processes and limitations of a septic system to a secondary wastewater treatment plant. 8. Debate the effectiveness of a law designed to protect water resources. 	<p>C10. Explain the role of septic and sewage systems on the quality of surface and ground water.</p> <p>C11. Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem.</p>

GRADE 7

Energy Transfer and Transformations

7.1 — Energy provides the ability to do work and can exist in many forms.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>7.1.a Work is the process of making objects move through the application of force.</p> <p>7.1.b Energy can be stored in many forms and can be transformed into the energy of motion.</p>	<ol style="list-style-type: none"> 1. Conduct simple experiments that show and explain how forces work to change the motion of an object. 2. Calculate work done on an object as force or distance varies. 3. Explain in writing how the six simple machines make work easier but do not alter the amount of work done on an object, and demonstrate how everyday objects function as simple machines 4. Determine ways to modify a simple machine (inclined plane, pulley and lever) to improve its mechanical advantage. 5. Defend the statement, “Work output of a machine is always less than work input because of energy lost due to friction.” 6. Design and create a working compound machine from several simple machines. 7. Use a diagram or model of a moving object (roller coaster, pendulum, etc.) to describe the conversion of potential energy into kinetic energy and vice versa. 8. Discuss different forms of energy and describe how they can be converted from one form to another for use by humans (e.g., thermal, electrical, light, chemical, mechanical). 9. Trace energy conversions that occur in the human body once food enters and explain the conversions in writing. 10. Calculate potential and kinetic energy and relate those quantities to total energy in a system. 	<p>C12. Explain the relationship among, force, distance and work, and use the relationship ($W = F \times D$) to calculate work done in lifting heavy objects.</p> <p>C13. Explain how simple machines, such as inclined planes, pulleys and levers, are used to create mechanical advantage.</p> <p>C14. Describe how different types of stored (potential) energy can be used to make objects move.</p>

GRADE 7

Structure and Function

7.2 — Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>7.2.a All organisms are composed of one or more cells; each cell carries on life-sustaining functions.</p> <p>7.2.b Multicellular organisms need specialized structures and systems to perform basic life functions.</p>	<ol style="list-style-type: none"> 1. Compare and contrast single-celled organisms with multicellular organisms. 2. Illustrate and describe in writing the structure and the functions of the following: cell membrane, cytoplasm, mitochondria and nucleus of an animal cell. 3. Explain how the structure and function of multicellular organisms (animals) depends on the interaction of cells, tissues, organs and organ systems. 4. Investigate and explain in writing the basic structure and function of the human skeletal system. 5. Differentiate between the structures and range of motion associated with ball, socket and hinge joints and relate human joints to simple machines. 6. Demonstrate how the muscles, tendons, ligaments and bones interact to support the human body and allow movement. 7. Label the major parts of the human respiratory system and explain in writing the function of each part (nasal cavity, trachea, bronchi, lungs and diaphragm). 8. Label the major parts of the human circulatory system and explain in writing the function of each part (heart, veins, arteries and capillaries). 9. Design and conduct controlled variable experiments to analyze the interaction between the circulatory and respiratory systems as the demand for oxygen changes. 10. Label the major parts of the human digestive system and explain in writing the function of each part in the chemical and physical breakdown of food (mouth, esophagus, stomach, small intestine, large intestine and rectum). 	<p>C15. Describe the basic structures of an animal cell, including the nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.</p> <p>C16. Describe the structures of the human digestive, respiratory and circulatory systems and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.</p> <p>C17. Explain how the human musculoskeletal system supports the body and allows movement.</p>

GRADE 7

Energy in the Earth's Systems

7.3 — Landforms are the result of the interaction of constructive and destructive forces over time.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>7.3.a Volcanic activity and the folding and faulting of rock layers during the shifting of the Earth's crust affect the formation of mountains, ridges and valleys.</p> <p>7.3.b Glaciation, weathering and erosion change the Earth's surface by moving earth materials from place to place.</p>	<ol style="list-style-type: none"> 1. Illustrate and describe in writing the composition of the three major layers of the Earth's interior. 2. Explain how Earth's internal energy is transferred to move tectonic plates. 3. Demonstrate the processes of folding and faulting of the Earth's crust. 4. Correlate common geological features/events (deep sea trenches, mountains, earthquakes, volcanoes) with the location of plate boundaries. 5. Compare geological features that result from constructive forces (e.g., mountains and ridges) with geological features that result from destructive forces (e.g., canyons and flood plains). 6. Analyze and interpret data about the location, frequency and intensity of earthquakes. 7. Compare and contrast the major agents of erosion and deposition of sediments: running water, moving ice, wave action, wind and mass movement due to gravity. 8. Investigate and determine how glaciers form and affect the Earth's surface as they change over time. 9. Distinguish between weathering and erosion. 10. Observe and report on the geological events that are responsible for having shaped Connecticut's landscape. 	<p>C18. Describe how folded and faulted rock layers provide evidence of gradual up and down motion of the Earth's crust.</p> <p>C19. Explain how glaciation, weathering and erosion create and shape valleys and floodplains.</p> <p>C20. Explain how the boundaries of tectonic plates can be inferred from the location of earthquakes and volcanoes.</p>

GRADE 7

Science and Technology in Society

7.4 — Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.

This content standard is an application of the concepts in content standard 7.2 and should be integrated into the same unit.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
7.4.a Various microbes compete with humans for the same sources of food.	<ol style="list-style-type: none"> 1. Investigate and describe in writing different types of microbes and the environmental conditions necessary for their survival. 2. Describe the optimum conditions for rapid bacterial growth. 3. Illustrate and describe the structural differences between bacterial and animal cells. 4. Discover and discuss how humans use bacteria to produce food and identify examples. 5. Compare and contrast the role of bacteria in food production and food spoilage. 6. Evaluate and report how each method of food preservation including dehydration, pickling, irradiation and refrigeration works to stop or inhibit bacterial growth and give examples of each. 	C21. Describe how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes.

GRADE 8

Forces and Motion

8.1 — An object's inertia causes it to continue moving the way it is moving unless it is acted upon by a force to change its motion.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>8.1.a The motion of an object can be described by its position, direction of motion and speed.</p> <p>8.1.b An unbalanced force acting on an object changes its speed and/or direction of motion.</p> <p>8.1.c Objects moving in circles must experience force acting toward the center.</p>	<ol style="list-style-type: none"> 1. Use appropriate tools and techniques to make observations and gather data to determine how forces, including friction, act on an object to change its position over time in relation to a fixed point of reference. 2. Calculate the average speed of a moving object, and distinguish between instantaneous speed and average speed of an object. 3. Create and interpret distance-time graphs for objects moving at constant and nonconstant speeds. 4. Predict the motion of an object given the magnitude and direction of forces acting on it (net force). 5. Investigate and demonstrate how unbalanced forces cause acceleration (change in speed and/or direction of an object's motion). 6. Assess in writing the relationship between an object's mass and its inertia when at rest and in motion. 7. Express mathematically how the mass of an object and the force acting on it affect its acceleration. 8. Design and conduct an experiment to determine how gravity and friction (air resistance) affect a falling object. 9. Illustrate how the circular motion of an object is caused by a center-seeking force (centripetal force) resulting in the object's constant acceleration. 	<p>C22. Calculate the average speed of a moving object and illustrate the motion of objects in graphs of distance over time.</p> <p>C23. Describe the qualitative relationships among force, mass and changes in motion.</p> <p>C24. Describe the forces acting on an object moving in a circular path.</p>

GRADE 8

Heredity and Evolution

8.2 — Reproduction is a characteristic of living systems and it is essential for the continuation of every species.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>8.2.a Heredity is the passage of genetic information from one generation to another.</p> <p>8.2.b Some of the characteristics of an organism are inherited and some result from interactions with the environment.</p>	<ol style="list-style-type: none"> 1. Relate the continued existence of any species to its successful reproduction and explain in writing the factors that contribute to successful reproduction. 2. Describe the structure, location and function of chromosomes, genes and DNA and how they relate to each other in the living cell. 3. Illustrate and chart the purpose, cell type (somatic and germ) and resulting chromosome count during cell division in mitosis and meiosis. 4. Identify the major structures in human male and female reproductive systems and explain where meiosis and gamete formation take place. 5. Investigate and report on the role of hormone production as it initiates and regulates the creation of male and female germ cells from birth through adolescence and into adulthood. 6. Compare and contrast the events and processes that occur when a human egg is fertilized or not fertilized. 7. Demonstrate the relationship of corresponding genes on pairs of chromosomes to traits inherited by offspring. 8. Describe in writing the role of the germ cells in the formation of the human zygote and its resulting 23 pairs of chromosomes, the 23rd of which determines gender and the other 22 of which determine the characteristics of that offspring. 	<p>C25. Explain the differences in cell division in somatic and germ cells.</p> <p>C26. Describe the structure and function of the male and female human reproductive systems, including the process of egg and sperm production.</p> <p>C27. Describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans.</p>

GRADE 8		
Earth in the Solar System		
8.3 — The solar system is composed of planets and other objects that orbit the sun.		
Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
<p>8.3.a Gravity is the force that governs the motions of objects in the solar system.</p> <p>8.3.b The motion of the Earth and moon relative to the sun causes daily, monthly and yearly cycles on Earth.</p>	<ol style="list-style-type: none"> 1. Relate the strength of gravitational force between two objects to their mass and the distance between the centers of the two objects and provide examples. 2. Describe in writing how gravitational attraction and the inertia of objects in the solar system keep them on a predictable elliptical pathway. 3. Distinguish between rotation of Earth on its axis and its elliptical revolution around the sun. 4. Investigate and report in writing how the Earth’s revolution around the sun affects changes in daylight and seasons. 5. Compare the revolution times of all the planets and relate it to their distance from the sun. 6. Conduct and report on an investigation that shows how the Earth’s tilt on its axis and position around the sun relates to the intensity of light striking the Earth’s surface. 7. Use a model to demonstrate the phases of the moon relative to the position of the sun, Earth and moon. 8. Develop a model or illustration to show the relative positions of the Earth, sun and moon during a lunar and solar eclipse and explain how those positions influence the view from Earth. 	<p>C28. Explain the effect of gravity on the orbital movements of planets in the solar system.</p> <p>C29. Explain how the relative motion and relative position of the sun, Earth and moon affect the seasons, phases of the moon and eclipses.</p>

GRADE 8

Science and Technology in Society

8.4 — In the design of structures there is a need to consider factors such as function, materials, safety, cost and appearance.

This content standard is an application of the concepts in content standard 8.1 and should be integrated into the same unit.

Core Science Curriculum Framework	Grade-Level Expectations <i>Students should be able to:</i>	CMT Correlations
8.4.a Bridges can be designed in different ways to withstand certain loads and potentially destructive forces.	<ol style="list-style-type: none"> 1. Identify the forces acting on a truss, beam and suspension bridge, including compression, tension and gravity using models, pictures or diagrams. 2. Explain in writing the advantages and disadvantages of truss, beam and suspension bridge design and visually identify each bridge. 3. Conduct an experiment to discover and report on a bridge's ability to support a load based on the interplay of tension and compression forces that result in a net force of zero. 4. Use technology to simulate how engineers plan, test and revise bridge designs given parameters including cost, time, safety and aesthetics. 	C30. Explain how beam, truss and suspension bridges are designed to withstand the forces that act on them.